

Claims

What is claimed is:

1. A prismatic battery module comprising:

5 a prismatic battery case constructed by connecting a plurality of prismatic cell cases together in series, said plurality of cell cases being separated from one another by separation walls respectively;

10 an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite directions, respectively; and

15 collectors connected to said lead portions on both sides of said electrode plate group,

20 said prismatic battery module being further constructed such that adjacent electrode plate groups consisting of said electrode plate group are connected to each other by connecting adjacent collectors of the respective electrode plate groups to each other through a connection aperture formed in a central portion of said separation wall and disposing said adjacent electrode plate groups in respective cell cases alongside in series, and a sealing material is applied to each space between each of said separation walls around said connection aperture and each of said collectors.

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2. A prismatic battery module comprising:

a prismatic battery case having a single internal space therein;

an electrode plate group formed by alternately stacking
5 positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite directions, respectively; and

10 collectors connected to said lead portions on both sides of said electrode plate group,

said prismatic battery module being further constructed such that a plurality of electrode plate groups consisting of said electrode plate group are connected together by
15 connecting adjacent collectors of the adjacent electrode plate groups to each other and arranging said plurality of electrode plate groups alongside in series in said prismatic battery case, and said single internal space is partitioned into a plurality cell cases by applying a sealing material to each
20 space between outer periphery of said adjacent collectors and a wall surface of said prismatic battery case.

3. The prismatic battery module according to claim 2, wherein said adjacent collectors, each having L-flanges formed on both sides thereof, are connected together to form T-shaped
25 portions in both side portions of said adjacent collectors,

and T-slots are formed in respective portions of sidewalls of said prismatic battery case, each of said respective portions of sidewalls corresponding to a position of a separation wall located between said plurality of cell cases, for said T-

5 shaped portions to engage said T-slots respectively.

4. The prismatic battery module according to any one of claims 1 and 2, wherein said adjacent collectors are connected to each other by using an electroconductive adhesive coated on opposing portions of said adjacent collectors, said opposing portions facing each other.

5. The prismatic battery module according to claim 2, wherein a seal rubber used as said sealing material is fixedly bonded to entire outer periphery of said adjacent collectors and an outer periphery of said seal rubber is pressed against wall surfaces of said prismatic battery case for sealing spaces formed between said adjacent collectors and said wall surfaces of said prismatic battery case.

6. The prismatic battery module according to claim 2, wherein said adjacent collectors are connected to each other by welding said adjacent collectors to an electroconductive plate disposed therebetween and spaces between outer peripheries of said electroconductive plate and wall surfaces of said prismatic battery case are sealed with a sealing material.

7. The prismatic battery module according to claim 2,

wherein said adjacent collectors are connected to each other by welding connection projections provided on said adjacent collectors together and spaces between outer peripheries of said collectors and wall surfaces of said prismatic battery case are sealed with a sealing material.

8. The prismatic battery module according to claim 2, wherein said lead portions of adjacent electrode plate groups are connected to a U-shaped collector and spaces between outer peripheries of said U-shaped collector and wall surfaces of said prismatic battery case are sealed with a sealing material.

9. A prismatic battery module comprising:

a prismatic battery case constructed by connecting a plurality of prismatic cell cases together in series, said plurality of cell cases being separated from one another by separation walls respectively;

an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite directions, respectively;

collectors connected to said lead portions on both sides of said electrode plate group; and

an electroconductive plate provided in at least one sidewall of said prismatic battery case and facing adjacent

cell cases,

said electroconductive plate being connected to adjacent collectors of adjacent electrode plate groups.

10. A prismatic battery module comprising:

5 a prismatic battery case constructed by connecting a plurality of prismatic cell cases together in series, said plurality of cell cases being separated from one another by separation walls respectively;

10 an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite directions, respectively;

15 a plurality of connecting rods formed so as to penetrate said lead portions on both sides of said electrode plate group, respectively; and

20 an electroconductive plate provided in at least one sidewall of said prismatic battery and facing adjacent cell cases,

each of said plurality of connecting rods and said electroconductive plate being connected to each other.

11. The prismatic battery module according to any one of claims 9 and 10, wherein electroconductive plates are provided 25 in both sidewalls of said prismatic battery case, and working

openings are formed in said both sidewalls of said prismatic battery case so as to expose said electroconductive plates, and said electroconductive plates and selected one from said collectors and said plurality of connecting rods are bonded together by using one bonding method selected from resistance welding and soldering, said one bonding method being performed by supplying welding current between both of said electroconductive plates in a state of said electroconductive plates and said selected one from said collectors and said plurality of connecting rods being in contact with each other.

12. A prismatic battery module comprising:

a prismatic battery case constructed by connecting a plurality of prismatic cell cases together, said plurality of cell cases being arranged alongside one by one in addition to being spaced apart from each other and being constructed in such a manner that one of both ends of one of said cell cases and one of both ends of another one of said cell cases adjacent to said one of cell cases are spatially connected to each other through a communicating space at a position of a connection portion to thereby form a zigzag chain of said plurality of cell cases;

an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one

side portion of said negative electrode plates in opposite directions, respectively; and

an electroconductive plate for providing electrical communication between a plurality of electrode plate groups by connecting said plurality of electrode plate groups together in such a manner that one of both lead portions of one of adjacent electrode plate groups and one of both lead portions of the other of said electrode plate groups are connected via said electroconductive plate to thereby form a zigzag chain of said plurality of electrode plate groups, said zigzag chain of said electrode plate groups being arranged alongside so as to have the same pitch as that of an arrangement of said plurality of cell cases,

said plurality of electrode plate groups connected together via associated electroconductive plates being disposed in said prismatic battery case and each space between said electroconductive plate and said prismatic battery case at said connection portion between said cell cases of said prismatic battery case being sealed with a sealing material.

13. A prismatic battery module comprising:

a prismatic battery case constructed by connecting a plurality of prismatic cell cases together, said plurality of cell cases being arranged alongside one by one in addition to being spaced apart from each other and being constructed in such a manner that one of both ends of one of said cell cases

and one of both ends of another one of said cell cases adjacent to said one of cell cases are connected to each other to thereby form a zigzag chain of said plurality of cell cases;

5 an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite
10 directions, respectively;

collectors connected to said lead portions on both sides of said electrode plate group; and

an electroconductive plate provided in a cell case connection portion of said prismatic battery case and facing
15 adjacent cell cases,

said electroconductive plate providing electrical connection between adjacent collectors of associated electrode plate groups.

14. A prismatic battery module comprising:

20 a prismatic battery case constructed by connecting a plurality of prismatic cell cases together in series, via associated separation walls made of a crank-shaped electroconductive plate, each of said separation walls having connection surfaces being arranged along a direction of an
25 arrangement of said plurality of cell cases in addition to

being formed in a central portion in a width direction of said cell case;

an electrode plate group formed by alternately stacking positive and negative electrode plates interposing a separator therebetween and further forming lead portions by projecting one side portion of said positive electrode plates and one side portion of said negative electrode plates in opposite directions, respectively; and

collectors connected to said lead portions on both sides of said electrode plate group;

said prismatic battery case accommodating said plurality of cell cases such that associated parts of adjacent collectors of adjacent electrode plate groups, said adjacent electrode plate groups being disposed in adjacent cell cases, faces each other interposing said connection surfaces therebetween and said adjacent collectors are connected to each other by welding said adjacent collectors to associated connection surfaces interposing said associated connection surfaces therebetween.

15. A method for manufacturing a prismatic battery module, comprising the steps of:

forming a prismatic battery case having a plurality of cell cases therein, said plurality of cell cases being connected together in series via associated separation walls and connection apertures, each connection aperture being

located in a central portion of each of said separation walls;

forming an electrode plate group having positive and negative electrode plates therein so as to project lead portions of said positive and negative electrode plates

5 therefrom on both sides thereof;

connecting collectors to said lead portions of said electrode plate group; and

inserting said electrode plate group in said cell case in such a manner that adjacent collectors of associated electrode plate groups are connected to each other via each of said connection apertures and at the same time, each space formed around said adjacent collectors is sealed.

16. A method for manufacturing a prismatic battery module, comprising the steps of:

15 forming a prismatic battery case having a space for forming a plurality of prismatic cell cases therein;

forming an electrode plate group having positive and negative electrode plates therein so as to project lead portions of said positive and negative electrode plates

20 therefrom on both sides thereof;

connecting collectors to said lead portions of said electrode plate group;

integrally connecting a plurality of electrode plate groups together in series, each of said electrode plate groups having said collectors connected thereto, in such a manner

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that adjacent collectors of associated electrode plate groups are connected to each other; and

inserting said plurality of electrode plate groups in said prismatic battery case in a state of individual opposing portions consisting of said adjacent collectors and an inner wall of said prismatic battery case interposing a sealing material therebetween.

17. A method for manufacturing a prismatic battery module, comprising the steps of:

forming a prismatic battery case having a plurality of cell cases integrally therein and an electroconductive plate facing adjacent cell cases in addition to being located between adjacent end portions of said adjacent cell cases;

forming an electrode plate group having positive and negative electrode plates therein so as to project lead portions of said positive and negative electrode plates therefrom on both sides thereof;

connecting one of collectors and connecting rods to said lead portions of said electrode plate group; and

inserting said electrode plate group in said cell case and connecting one of said collectors and said connecting rods to said electroconductive plate.

18. A method for manufacturing a prismatic battery module, comprising the steps of:

forming a prismatic battery case having a single internal

space therein;

forming an electrode plate group having positive and negative electrode plates therein so as to project lead portions of said positive and negative electrode plates

5 therefrom on both sides thereof;

connecting electroconductive plates to said lead portions of said electrode plate group and integrally connecting a plurality of electrode plate groups together in series via said electroconductive plates; and

10 disposing said plurality of electrode plate groups in said prismatic battery case in a state of individual opposing portions consisting of each of said electroconductive plates and an inner wall of said prismatic battery case interposing a sealing material therebetween, thereby partitioning said
15 internal space into a plurality of cell cases.